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Master Index to Volumes 201–210

Electron Paramagnetic Resonance of d Transition Metal Compounds

by **F.E. Mabbs** and **D. Collison**, University of Manchester, Manchester, UK

Studies in Inorganic Chemistry Volume 16

Electron paramagnetic resonance (epr) spectroscopy is a sensitive and versatile method of studying paramagnets, which is finding increasing use in chemistry, biochemistry, earth and materials sciences.

The technique is treated both qualitatively and quantitatively, with a progressive increase in sophistication in each succeeding chapter. Following a general introductory chapter, the first half of the book deals with single unpaired electron systems and considers both metal and ligand Zeeman, hyperfine and quadrupole interactions. The simulation of these spectra is discussed, followed by the relationship between spin-Hamiltonian parameters and models of the electronic structures of paramagnets. The second half of the book treats multiple unpaired electron systems using the same philosophy. An introduction to the epr properties of cluster compounds and of extended exchanging systems is also given. There is a chapter on linewidths and lineshapes, and an extensive appendix containing much additional information. A wide-ranging library of simulated and experimental spectra is given, as well as graphical data which should aid spectrum interpretation. Each chapter contains key references and there is a substantial subject and keyword index.

This book is designed to teach epr spectroscopy to students without any previous knowledge of the technique. However, it will also be extremely useful to researchers dealing with paramagnetic d transition metals.

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EUROGEL '91

Progress in Research and Development of Processes and Products from Sols and Gels

Proceedings of the 2nd European Conference on Sol-Gel Technology,
Saarbrücken, Germany, 2-5 June 1991

edited by **S. Vilminot, R. Nass** *and* **H. Schmidt**

European Materials Research Society Monographs Volume 5

Eurogel '91 is the second conference to report on the developments in research and technology of European laboratories and industry. The volume focuses on the scientific and technological progress in the field, as well as providing a global overview of the latest developments. The fifty presented papers report on many new themes and research groups.

Expansion in the utilization of the sol-gel process for new products and processes is developing steadily. Application requires an interdisciplinary effort beginning with application orientated fundamental research and ending up with engineering and technology. This interdisciplinary contact can be enhanced by closer cooperation between research and industry. In particular, potential users of innovative materials should become more aware of the possibilities connected with sol-gel technologies. At present the sol-gel process is considered as one of the most important technologies for developing innovative glasses, ceramics and composites. The contributions in this volume will be of interest to all those who are involved in the development potential of industrial and market needs.

Abbreviated contents: **I. Invited Lectures. Survey over the State of the Art of Sol-Gel Activities.** Survey over the state of the art of sol-gel activities in the United States *(D. Uhlmann)*. Sol-gel processing of advanced ceramics by molecular level designing *(S. Hirano, T. Yogo)*. Glass-research and fiber drawing by sol-gel processes in Japan *(T. Yoko, S. Sakka)*. Scientific fields and practical applications of sol-gel techniques in the Soviet Union *(B. Shalumov)*. Survey over the state of the art in the field of processing of inorganic-organic composite materials *(H. Schmidt)*. **II. Precursor Chemistry.** Thermal decomposition of hydrosilsesquioxane gels under argon *(V. Belot et al.)*. Heterometallic alkoxides as precursors to multi-component oxides: Some examples based on Pb-Nb and Cd-Nb systems *(L.G. Hubert-Pfalzgraf et al.)*. **III. Coatings.** Preparation of catalysts on a ceramic substrate by sol-gel technology *(A. Bos et al.)*. Patternable inorganic-organic copolymers *(ORMOCERs) (M. Popall et al.)*. Preparation of superconducting thick films using sol-gel *(H. Wedemeyer, J.Y. Zhang)*. **IV. Porous Materials and Composites.** Alcoholic fermentation with *saccharomyces cerevisiae* trapped in SiO_2 films *(S. Dire et al.)*. The preparation and characterization of Sn-Si-O gels. Part II: The effect of thermal treatment *(C.C. Perry et al.)*. Structural and mechanical evolution of partially densified aerogel during the aerogel-glass process *(T. Woignier et al.)*. **V. New Processing Techniques.** Fabrication of large size near net shape components of silica glass *(M. Beghi et al.)*. Elaboration of mullite and cordierite powders by organic gels *(A. Douy)*. A conductivity study on V_2O_5 based amorphous materials *(G.P. Triberis)*. **VI. Poster Sessions.** Precursor Chemistry. Coatings. Porous Materials and Composites. New Processing Techniques. General Topics, Glasses and Ceramics.

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The Chemical Physics of Solid Surfaces

edited by **D.A. King** *and* **D.P. Woodruff**

Volume 6: Coadsorption, Promoters and Poisons

Although there has been a tremendous development of new techniques to facilitate the study of well-characterised surfaces, there remains a dearth of publications devoted to the application of these methods. This is particularly true in the case of multi-technique studies, directed to understanding key aspects of surface chemistry and physics. This series of books sets out to rectify this state of affairs by providing reviews which concentrate on the scientific achievements in terms of new understanding of the chemical physics of surfaces, rather than the methodology. Since the earlier volumes have appeared, there has been an increasing shift of emphasis to these multi-faceted approaches to understanding surface chemical problems, which makes the series even more appropriate to the needs of the research community.

The present volume provides particularly clear evidence of this growth. In the specific area of application of heterogeneous catalysis, substantial progress is being made in confronting problems of increasing complexity, such as those associated with *Coadsorption, Promoters and Poisons*, which forms the subject matter of this book. This progress is reflected in sophisticated theoretical calculations as well as experiments, and both areas are covered in chapters which are written by acknowledged experts in the field. Specific problems covered include the effect of promoters (especially alkali metals) and poisons in CO, water and hydrogen surface chemistry including Fischer-Tropsch and water-gas shift reactions, and in ammonia synthesis. In addition, two chapters are devoted to different aspects of alloy surface chemistry (bulk alloys and thin overlayer films), while one further synergistic effect concerns the so-called strong metal support interaction. In all cases, connections are made to the related catalyst studies, although the emphasis is on the achievements of the model investigations of well-characterised surfaces.

The book should be of interest to the many researchers in the field of surface science (coming from backgrounds in chemistry, physics and materials science), as well as to those interested in heterogeneous catalysis.

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CHEMICAL PHYSICS LETTERS

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Mössbauer Studies of Surface Layers

By **G.N. Belozerski**

Studies in Physical and Theoretical Chemistry Volume 81

Mössbauer spectroscopy has evolved as one of the few methods available for investigation of solids differing in depth by several orders of magnitude. This recent development has made the problems of surface investigation and the study of separate layers amenable to investigation. The parameters of the hyperfine interaction derived from the Mössbauer spectra provide valuable information on the chemical bond character and on magnetic properties of surface layers as well as on the change of the properties with the depth from the outermost surface layer. It is possible to carry out quantitative phase analysis and to use the technique to study different transformations in the solid which result from external effects under a wide range of temperatures and pressures.

This book is one of the first attempts at a consistent presentation of theoretical and practical problems of the use of Mössbauer spectroscopy to study solid surfaces, its applications, and development. The applications include: surface studies with hyperfine probes in the following fields: oxidation and corrosion of metals and alloys: passivating and protective coatings: physics of metals: annealing and quenching, mechanical and chemical treatment, ion implantation and laser treatment; texture of near-surface layers. Mössbauer spectroscopy is one of the best methods for *in situ* characterization of solid/solid and solid/solution interfaces. It lends itself to *in situ* studies of surfaces under various coatings and processes, surface magnetism and the effect of the gas phase on the properties of the surface layers and the structure and magnetic properties of epitaxially grown monolayers on the surface of oriented single crystals.

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Inorganic Polymeric Glasses

By **R.C. Ropp**, *Warren, NJ, USA*

Studies in Inorganic Chemistry Volume 15

The author describes a novel method of preparing hydrolysis-stable non-silicate glasses which is based on experimental work accomplished over the past twenty years. As such, the method is the beginning of a new approach to glass-making by the use of a molecularly-polymerizable precursor.

The book elucidates the technical details required to produce such molecularly-polymerized glasses from carefully prepared inorganic molecular monomers. Essentially, only silicate-based glasses have been known to be stable, whereas non-silicate glasses could not be attributed with such properties. Such glasses have, therefore, not found widespread usage in industry. The new phosphate glasses described here exhibit stabilities superior to many of the silicate glasses.

Researchers in glass and glass properties will find this volume extremely useful and those involved in organic polymers will be intrigued by the similarities and disparities of the two systems.

Contents: 1. Introduction to Silicate Glass Technology.
Glass and Antiquity. The Glassy or Vitreous State. Glass Formers and Glass Compositions. The Manufacture of Silicate-Based Glasses. Forming and Finishing Operations. Thermal Processing and Properties of Silicate Glasses. Inherent Properties of Glass. Silicate Glass Products Currently being Manufactured.
2. Introduction to Polymeric Glasses.
Prior Attempts to Prepare Stable Phosphate Glasses. Structural Units in Glass. Basis for Chain Structure of Polymerized Phosphates. Prior Attempts to Prepare Phosphate Glasses by the Melting of Stoichiometric Compounds. Crystalline Salt Monomers for Stable Phosphate Glass Preparation.
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Dynamics of Excited Molecules

Edited by Kozo Kuchitsu

Studies in Physical and Theoretical Chemistry Volume 82

The physical and chemical properties of the molecular species reviewed in this book, and sometimes the species themselves, had been postulated or predicted but their exact details remained essentially unexplored for decades. The recent advances in chemical physics (such as laser spectroscopy and quantum-theoretical calculations) have provided techniques for their unambiguous identification. Accurate data on their structures and dynamics are now available. Such information is indispensable for detailed discussion on the various properties of molecules and the mechanisms of intermolecular interactions and chemical interactions.

Information on the dynamics of excited molecules constitutes a firm basis of modern chemistry and physics. Moreover, it is of paramount importance in various fields of basic and applied sciences where chemical reactions play important roles: atomic and molecular physics, atmospheric and environmental science, space science, materials science, and biology.

This book contains 13 review articles on
(1) the techniques for production and identification of excited molecules in the gas phase, condensed phases, and intermediate phases (intermolecular complexes and atomic or molecular microclusters)
(2) their structures and dynamics (internal reactions) observed mainly by spectroscopic experiments
(3) their important roles in chemical processes. The target chemical species range from diatomics to relatively complicated aromatics in a variety of electronic and vibrational excited states, many of them being nonrigid or short-lived molecules, radicals, and positive or negative ions.

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Physico-Chemical Properties of Selected Anionic, Cationic and Nonionic Surfactants

by **N.M. van Os, J.R. Haak** *and* **L.A.M. Rupert**

The number of physico-chemical investigations of surfactants in solution, whether aqueous or nonaqueous, has dramatically increased in recent years. However, literature reports on surfactants in solutions are scattered over a plethora of scientific journals and books which differ widely in scope and readership. Such data are often difficult to retrieve because there have been no systematic compilations, with the exception of those for CMCs and for micelle aggregation numbers.

The present compilation meets that need by covering, as completely as possible, the physico-chemical properties of selected series of homologous surfactants. These surfactants are in most cases isomerically pure, are well-known, and have been used in numerous academic and industrial studies. The properties include aggregation number, cloud point, CMC, ^{13}C-NMR, correlation length, counterion binding, density, enthalpy of micelle formation, entropy of micelle formation, Gibbs' free energy of micelle formation, head group area, ^{1}H-NMR, hydration number, Krafft temperature, melting point, micelle radius, microscopic viscosity, miscibility curve, partial molar volume, phase inversion temperature, refractive index, self- diffusion coefficient, surface tension, and upper critical temperature. The book also contains two- and three-component phase diagrams of many nonionic surfactants.

The solvent is water in most cases; however, some data refer to properties in D_2O, electrolyte solutions, and nonaqueous solvents. The variables are temperature and concentration. Where possible, the method of measurement is given. Data on the purity of the compounds and the accuracy of the measurement methods are not included, as these can easily be found in the original sources, which mostly date from the period 1970-1991 and are given at the end of each chapter. The Index section contains a compound index, a property index, a symbol index and a cross index which facilitate easy access to the data.

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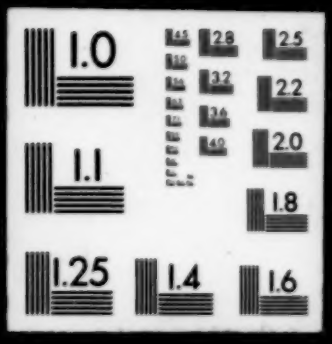
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